CHAPTER 2
Demand Estimates and Projections

Water demands in this chapter are first considered in terms of the demands of the water users or customers. This is the water that directly meets the needs of the users. Additional data in **Chapter 7** and **Appendix D** present the water withdrawal demands (demands on the water resources) needed to meet these user and customer demands. The water withdrawal demands reflect the proposed selections of sources, treatment processes, storage options and reuse of reclaimed water that result from the projects identified in **Chapter 7**. The water withdrawal demands in **Appendix D** are also presented in this chapter.

User/Customer Demand or **Net Demand:** The water demands of the end user, after accounting for treatment and process losses, and inefficiencies (e.g., irrigation inefficiency). When discussing Public Water Supply, the term "finished water demand" is commonly used.

Withdrawal Demand or **Raw Water Demand:** The amount of water that must be withdrawn from the groundwater or surface water system to meet a particular need. Withdrawal demands are nearly always higher than User/Customer Demands because of inherent treatment and process losses, and inefficiencies associated with delivering water from the source to the end user.

The planning period for this update of the Lower West Coast (LWC) Plan is 2005 to 2025. Extensive baseline information was collected for Year 2000, including population, land use, cropping and irrigation systems, historical water use, climatic conditions, etc. This information was used to develop water use factors, such as per capita finished water demands by utility, which were then used along with projected variables, such as population, to project future water demands. Some data, such as population by county, were updated through 2005 since these estimates have recently become available.

This chapter provides an overall perspective of the user/customer and water withdrawal demands and associated growth from 2005 to 2025. The water demand projections summarized in this chapter are presented in terms of average weather conditions. **Appendix D** provides demand projections for 1-in-10 year drought conditions. It also provides additional information on water demand within each use category. In the case of agriculture, acreage and demands by crop type are included, and in the case of public water supplies, population and demands by utility are provided. Although not quantified in this chapter, environmental demands are addressed during the water supply planning process using resource protection criteria.

A l-in-10 year drought event is an event that results in an increase in water demand to a magnitude that would have a 10 percent probability of being exceeded during any given year. Subsection 373.0361(2)(a), Florida Statutes (F.S.), states the level of certainty planning goal associated with identifying demands shall be based on meeting demands during a l-in-10 year drought event.

DEMANDS BY WATER USE CATEGORY

Water Use Categories

Agricultural water is used for crop irrigation, livestock watering and aquaculture.

Public Water Supply refers to all potable (drinking quality) water supplied by water treatment facilities with projected average pumpages for 2025 greater than 100,000 gallons per day (GPD) for all types of customers. The remaining water use categories are all self-supplied.

Domestic Self-Supply reflects households served by small utilities (less than 100,000 GPD) and/or private wells.

Recreational water use includes golf course irrigation demand. The Landscape subcategory includes water used for parks, cemeteries and other self-supplied irrigation uses with demands greater than 100,000 GPD.

Commercial and Industrial water uses are business operations using a minimum water quantity of 100,000 GPD.

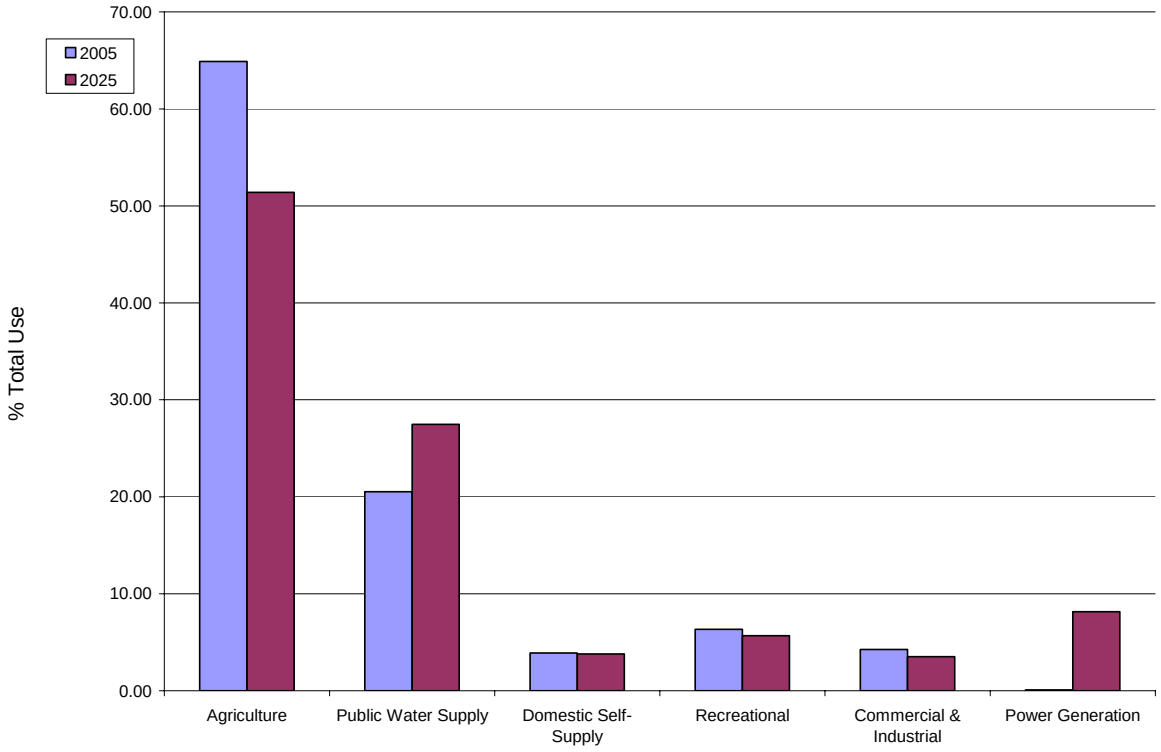
Thermoelectric Power Generation water is consumed by power plants in the production of electricity.

Water demand estimates for 2000 and projections through 2025 were made in five-year increments for each of the six water supply categories (defined previously). Key results in terms of water withdrawals (See **Figure 3**) specific to the Lower West Coast (LWC) Planning Area for the period of 2005 to 2025 include:

- Regionwide, Public Water Supply (PWS) demands are expected to increase by 97 million gallons per day (MGD) or 76 percent by Year 2025, at which time this water supply category will represent approximately 27 percent of the region's total water demands.
- Agricultural water use, which is projected to increase by about 17 MGD or 4 percent, will remain the largest consumer of water in the LWC Planning Area.
- Thermoelectric Power Generation Self-Supply is a rapidly growing water use category. Future demand projections reflect the nearly 67 MGD required to serve new power generation facilities planned by Florida Power & Light (FPL).

- The remaining water use categories—Domestic Self-Supply, Commercial and Industrial, Recreational and Landscape—will also experience increased demands totaling 16 MGD by 2025.

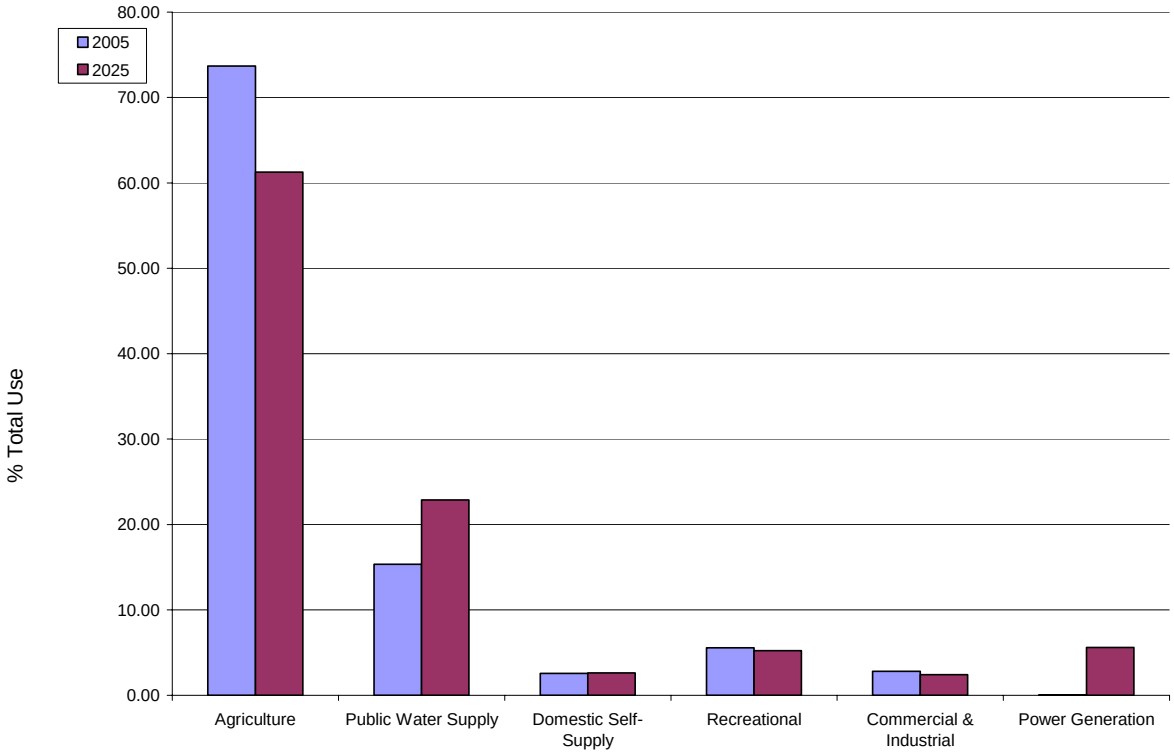
Providing for these increased demands requires a commitment to a coordinated water planning effort. **Figure 2** shows the user/customer water demands by use category.



	Agriculture	Public Water Supply	Domestic Self-Supply	Recreation	Commercial & Industrial	Power Generation	Total
Estimated 2005 MGD	404.8	128.1	24.4	39.5	26.6	0.5	623.9
Projected 2025 MGD	421.8	225.5	31.1	46.6	28.9	66.9	820.8
% Change MGD	4.2%	76%	27%	18%	9%	13,280%	32%

Figure 2. User/Customer Demands – Water Categories as a Percentage of Total Demand in Bar Chart and Average Year Demands and Percentage of Growth in Tabular Chart.

Figure 3 shows the associated withdrawal demands as developed in **Appendix D**. The withdrawal demands are comparable to the demand estimates presented in previous Lower West Coast water supply plans. The water withdrawal demands differ from the user/customer demands for Public Water Supply, Recreational Self-Supply and Agricultural uses. The differences are caused by inefficiencies in delivery or treatment that prevents all the water being withdrawn from being available to meet the user/customer demands.



	Agriculture	Public Water Supply	Domestic Self-Supply	Recreation	Commercial & Industrial	Power Generation	Total
Estimated 2005 MGD	698.1	145.3	24.4	52.6	26.6	0.5	947.5
Projected 2025 MGD	729.2	272.2	31.1	62.2	28.9	66.9	1190.5
% Change MGD	4%	87%	27%	18%	9%	13280%	26%

Figure 3. Water Withdrawal Demands – Water Categories as a Percentage of Total Demand in Bar Chart and Average Year Demands and Percentage of Growth in Tabular Chart.

POPULATION AND WATER USE TRENDS

The region's population is expected to increase by 74 percent from 2005 to 2025, with Collier and Lee counties experiencing the greatest growth. **Table 1** provides a summary of the population estimates for the counties or portions of counties located in the LWC Planning Area. The distribution of population estimates to individual utilities is based on historical data and projected distributions of population to traffic zone analyses and utility service areas. **Figure 2** provides a summary of the projected water demands under average year conditions between 2005 and 2025 for all water supply categories.

Table 1. Population in the LWC Planning Area, 2005–2025.

	2005			2025		
County Area	Population[a]	Public Water Supply	Domestic Self-Supply	Projected Population	Public Water Supply	Domestic Self-Supply
Collier	317,601	272,130	45,471	608,002	532,037	75,965
Lee	541,398	457,634	83,764	906,199	828,383	77,816
Hendry (portion in LWC Planning Area)[b]	37,097	26,697	10,400	51,821	41,393	10,428
Glades (Portion in LWC Planning Area)[b]	6,283	3,156	3,127	7,889	3,947	3,942
Charlotte (Portion in SFWMD)[b]	6,163	0	6,163	8,673	0	8,673
Total Planning Area	908,542	759,617	148,925	1,582,584	1,405,760	176,824

a. Source: U.S. Bureau of the Census, 2001, and University of Florida Bureau of Economic and Business Research, 2006.
b. See following discussion and in Chapter 4 concerning potential urbanization in these counties.

Agricultural Water Use

Agricultural acreage in the LWC Planning Area is expected to increase by about 13,400 acres between 2005 and 2025, with local declines in cultivated acreage in Lee and Collier counties and increases in Hendry and Glades counties. The overall water use in this category is projected to increase by about 4 percent during this planning period. Relative to the total water use in the LWC Planning Area, the agricultural water use category is projected to decrease from 74 percent of current water withdrawal demands to 61 percent by 2025, reflecting the projected substantial increase in urban sector water uses.

Sugarcane in the LWC

Agricultural water demand reflects projected irrigated acreage, crop and soil types, growing seasons, and irrigation system types and strategies.

Acreage projections are based on the data and methods contained in the land use projection analysis completed by the South Florida Water Management District (SFWMD or District) to support the 2000 LWC Plan and the Southwest Florida Feasibility Study (SWFFS). The agricultural acreage estimates also considered input provided by representatives of the agricultural community.

Agricultural Self-Supply demand calculations for this 2005–2006 LWC Plan Update were made using the Agricultural Field Scale Irrigation Requirement Simulation (AFSIRS) Model. This is a change from the 2000 LWC Plan, which used a modified Blaney-Criddle Model to estimate supplemental requirements for irrigation. Use of the Blaney-Criddle Model generally results in a higher per acre irrigation estimate than the AFSIRS Model. This chapter presents the net irrigation demands for agriculture because the net demands estimate the amount of water farmers need to place into the root zone of crops. Gross irrigation requirements reflect the efficiency of delivery of that water and are affected by the projects discussed in **Chapter 7**. Both net and gross irrigation demands by crop type are presented in **Appendix D**.

Public Water Supply and Domestic Self-Supply

The LWC Planning Area includes all populations of Collier and Lee counties and portions of Hendry, Glades and Charlotte counties. The population of Collier County is expected to almost double over the next two decades, and Lee County's population will increase 67 percent during the same period (**Table 1**). Public Water Supply customer demands grow significantly through the projection period, primarily due to the expected population increase. Domestic Self-Supply demand growth is less significant as most new potable water demand will be served by public water systems.

LWC Urban Development

The permanent resident populations used in this update are consistent with the 2000 Census of population and medium population projections from the University of Florida, Bureau of Economic and Business Research (BEBR 2001). The District used medium-BEBR county populations, except in the case of Collier County for which the District used alternative projections approved by the Florida Department of Community Affairs (FDCA) and supported by its local government's comprehensive plan. These projections are higher than the medium-BEBR projections.

Estimates of Public Water Supply and Domestic Self-Supply water use were made based on 2000 per capita use rates by utility and the distribution of the county level population estimates and projections into utility service areas. For Lee and Collier counties, the distribution of population relied primarily on Traffic Analysis Zone projections, which are used for transportation planning within each county. For the portions of Charlotte, Glades and Hendry counties in the LWC Planning Area, the amount and locations of growth are subject to considerable uncertainty because of rapidly evolving development plans and proposals. However, these plans and proposals have not progressed to the point where alternatives to the medium-BEBR population projections and historical patterns of location of growth within the counties have been approved. For these reasons, the projections for these counties in this plan update use medium-BEBR and historical patterns of development in assigning the growth to utilities and self-supplied users. **Chapter 4** provides a further discussion of potential growth in these areas. Additionally, these projections were coordinated with the utilities that resulted in some adjustments, such as reducing growth for the Island Water Association, which serves the City of Sanibel.

Conservation measures were not factored into the demand projections used in this chapter. Rather, conservation is considered a water source option and discussed in **Chapter 5**.

Recreational Self-Supply

Recreational water use is projected to exceed 46 MGD by 2025, a nearly 20 percent increase over the 2005 estimated use. Recreational Self-Supply water usage projections primarily include water demands for golf course irrigation and are typically identified through consumptive use permits. The acreages for this use were developed as part of the overall geographic information system (GIS) land use analysis supporting the 2005–2006 LWC Plan Update and the Southwest Florida Feasibility Study (SWFFS). Landscape irrigation demand projections are included within this recreational category.

Commercial and Industrial Self-Supply

Demands for Commercial and Industrial Self-Supply are based on 2000 demands developed and reported by the U.S. Geological Survey (USGS). Because this demand category is small and historical data fail to support any trends in use, the levels are generally held constant through the projection period. The one exception is that industrial use by U.S. Sugar in Clewiston is included with the water utility use in 2005, and is classified as Commercial and Industrial in projection years as a separate utility being established to serve the potable water supply needs of Clewiston.

Thermoelectric Power Generation Self-Supply

The need for additional power supplies is expected to grow as the population in the LWC Planning Area and other portions of south Florida grows. In addition, the major power supplier, FPL, expects that much of the additional generating capacity to be installed will use fresh or brackish water sources and cooling tower technology as a heat rejection method. To date, most of the generating capacity has used flow through cooling, and much of this has been ocean water, the use of which is not covered by the water supply plans.

Florida Power & Light expects to construct five additional power generation facilities in the LWC Planning Area. None of these plants have been sited other than to identify general locations within the LWC Planning Area. As shown in **Figure 2** and **Figure 3**, power generation water use demands are expected to increase to 67 MGD by 2025. These estimates represent the water needed to support power generating capacity proposed to be located in the LWC Planning Area.

DEMAND PROJECTIONS IN PERSPECTIVE

The demand projections presented in this 2005–2006 LWC Plan Update are based on the best information available at this time. However, these projections reflect trends, circumstances and industry intentions that change over time. For example, this plan update expects much greater population growth than what the 2000 LWC Plan anticipated. The growth is large enough that accommodating this population will require infill and development of existing urban areas, as well as development outside of current urban service boundaries. Where this new development will occur and the extent to which it may include historically rural portions of the LWC Planning Area, especially Charlotte, Glades and Hendry counties, are important issues. The potential for rapid development of new urban areas in Charlotte and Hendry counties is such that this LWC Plan Update may require interim updates. The District will continue to work closely with local governments and monitor growth decisions in these areas.

The agricultural land use projections are also uncertain, first because agriculture is highly dependent on global market conditions, and second, because it is subject to real estate pressures from urban development and ecosystem restoration efforts. Furthermore, factors, such as citrus canker and greening, may have major effects on the future of agriculture within the study area.

In summary, the major driving force behind the significant growth in water demands reflected in this 2005–2006 LWC Plan Update is the region's anticipated population growth. Most of this growth, in absolute terms, is expected to take place in Lee and Collier counties.

The LWC Planning Area's population growth of about 674,000 residents for the 20-year period from 2005 to 2025 is significantly higher than the absolute growth in

population of 402,000 residents expected for the 25-year period from 1995 to 2020 in the 2000 LWC Plan. The net result is that the 20-year growth in urban withdrawal demands (all demand sectors except agriculture) in this plan update is 212 MGD, whereas it was forecasted to be only about 63 MGD in the previous plan.

In contrast, gross agricultural demands are projected to increase by 31 MGD between 2005 and 2025, which is similar in magnitude to the 26 MGD growth projected in the previous plan.

Appendix D provides a full description of the methods used to estimate water use for each major usage category and includes estimates of both the customer demands discussed here and the raw water withdrawals, which would result from implementation of the projects discussed in **Chapter 7**.